

# Low Impact Development & Stormwater Management: New Roles for District Employees?

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# Low Impact Development (LID)

## **GOAL:**

Help maintain a  
hydrologically functional  
landscape

NO MANDATE, but emerging trend.

# *Conventional Site Design*



*Good Drainage Paradigm*

# Impact on Soils / Hydrology (Conventional Development)

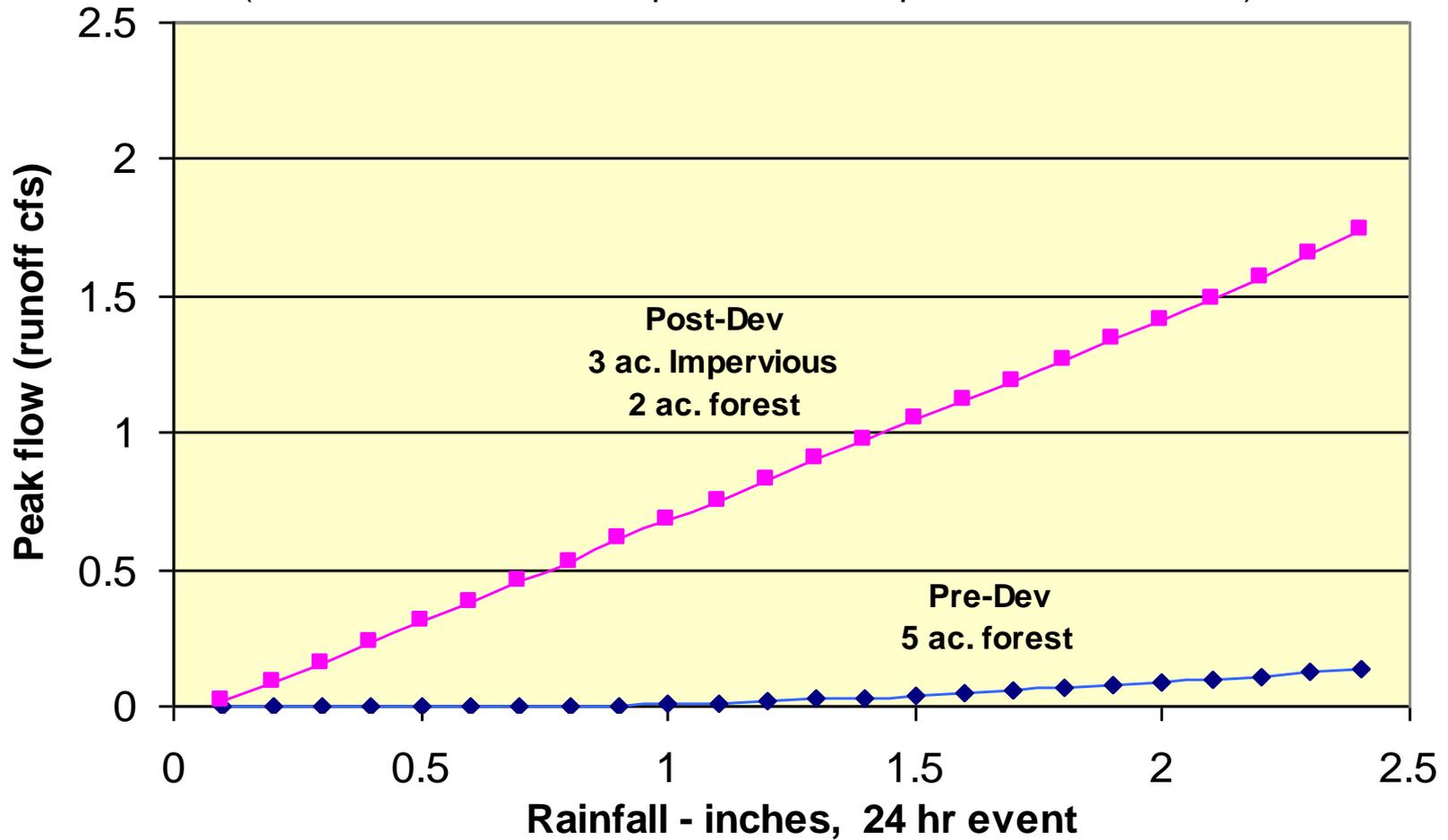
- Clear Vegetation
- Remove Top Soil
- Compaction
- Change Grades
- Modify Drainage
- Destroy Biological Activity
- Destroy Soil Structure/Function



# Impact on Stream Discharge (Conventional Development)

**Figure I.6.2 Pre / Post development comparison**

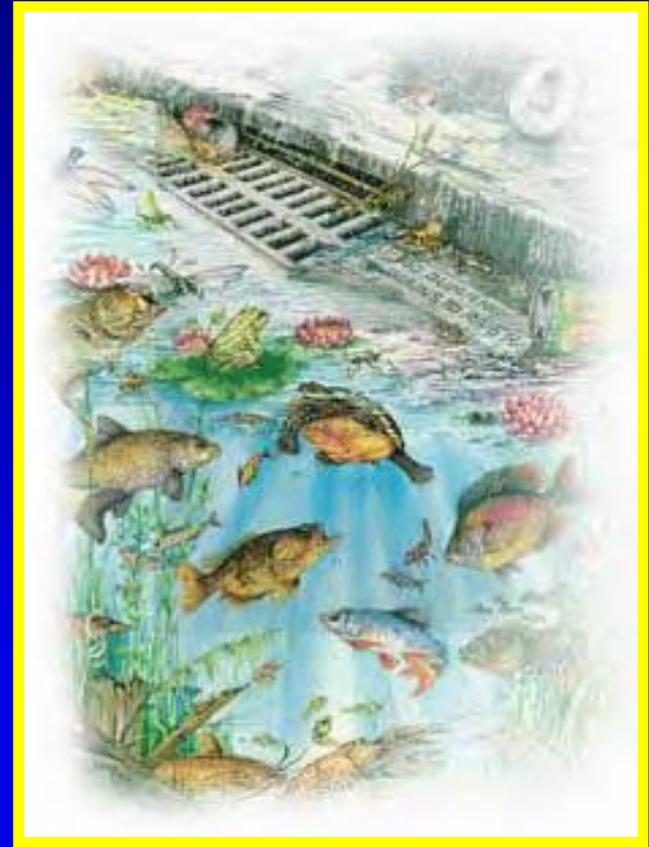
(Source: SBUH method, perv. Cn 70/imp. Cn 99, 5 acre site)



# Impact on Water Quality (Conventional Development)

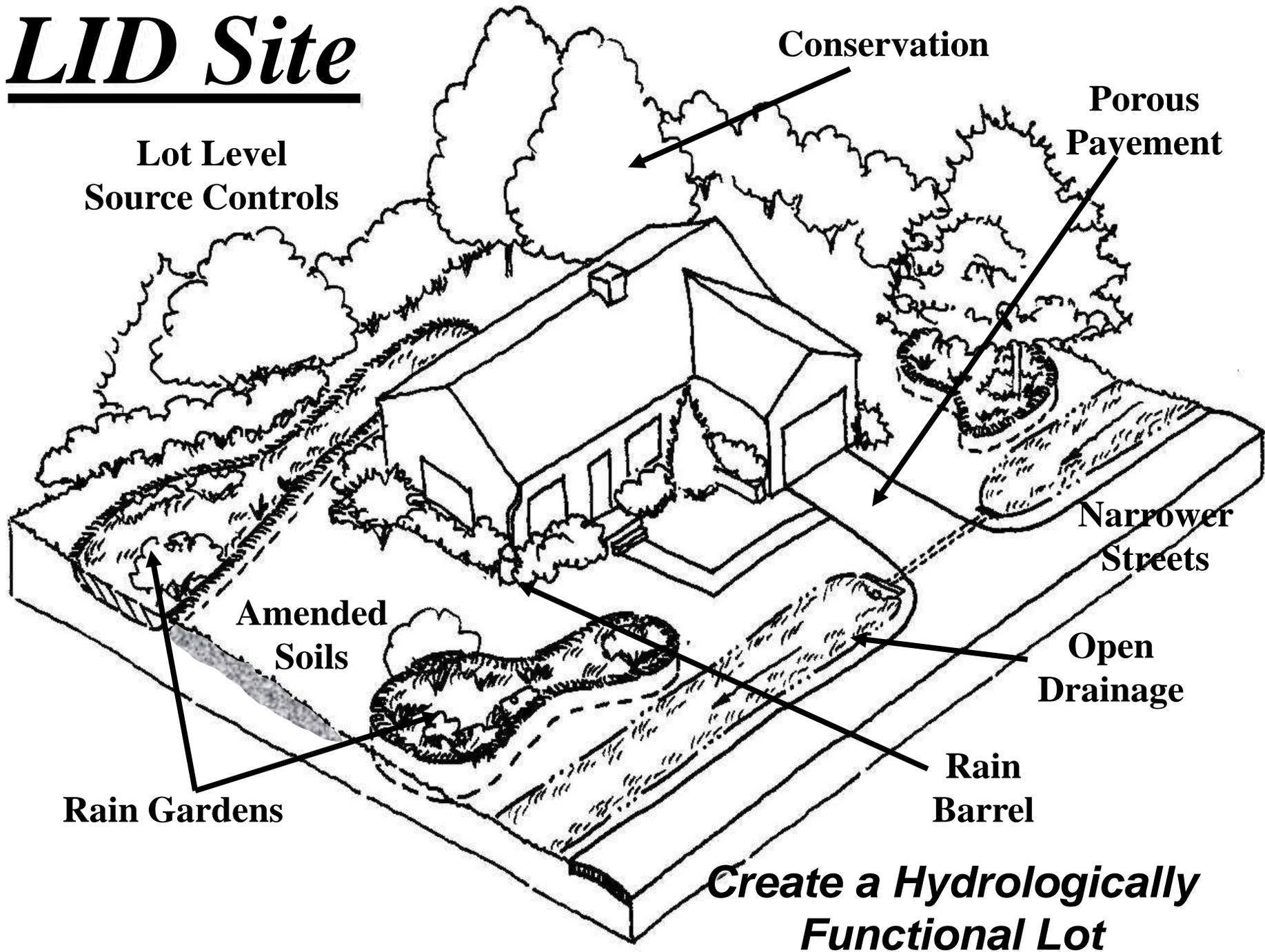
## Rapid drainage and poor soil:

- increased need for fertilizer to grow grass, etc.
- increased need to water lawns  
→ more polluted runoff
- less cleaning of water by soil



Detention ponds: can help lessen flooding impact  
generally do not improve water quality

# *LID Site*

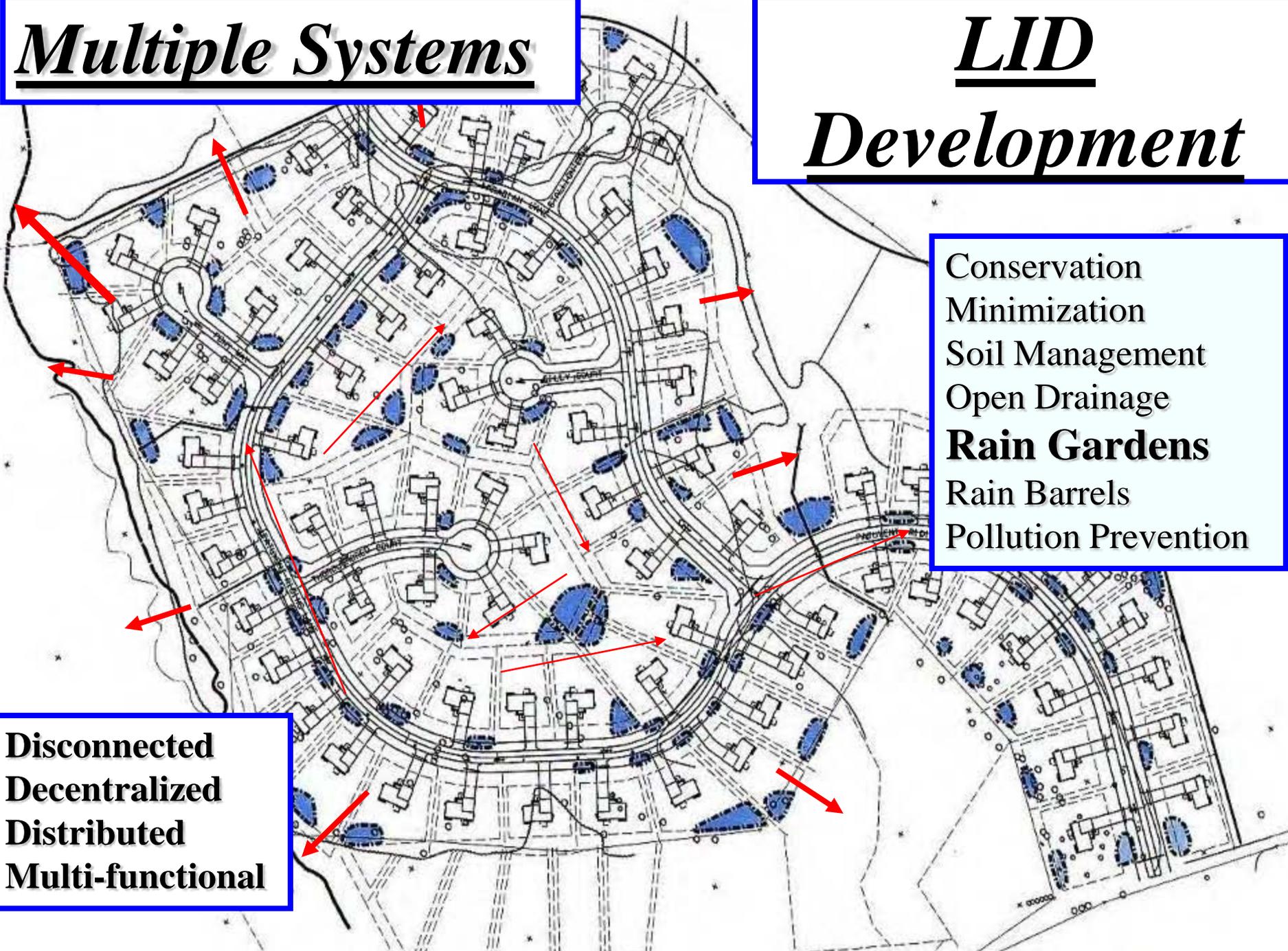


# Multiple Systems

# LID Development

Conservation  
Minimization  
Soil Management  
Open Drainage  
**Rain Gardens**  
Rain Barrels  
Pollution Prevention

**Disconnected**  
**Decentralized**  
**Distributed**  
**Multi-functional**



# Low Impact Development

Retain Original Vegetation – especially quality vegetation

→ smaller lot size w/ conservation areas

Retain Top Soil

Avoid Compaction – plan development carefully

Use Existing Grades

Work with Existing Drainage

Maintain Biological Activity

Maintain / Restore Soil Structure / Function

Retain natural water features (and protect riparian areas)

Conservation District Employees

→ could help developers with **SITE PLANNING** to ensure above characteristics



# Grove Area rain gardens



# Low tech rain garden at home



# Stormwater Management Rules

## Stormwater

→ Water that runs over land surfaces when it rains.

Federal Rules for municipalities (mandate)

→ Phase II (Dec '99):

### Minimum Control Measures

- \* Public Education and Outreach

- Public Participation / Involvement\*

- Illicit Discharge Detection and Elimination

- \* Construction Site Runoff Control (1 to 5 acre)

- \* Post Construction Runoff Control

- Pollution Prevention/Good Housekeeping



# Construction Runoff

## PROBLEMS:

- Topsoil loss
- Clogged ditches, culverts, sewers
- Muddy / filled in lakes & streams
- Damage to plants and animals
- Damage to aquatic habitat
- Structural damage to roads, etc.



# Construction Runoff Control

## Five principles of Soil Erosion Control:

1. Plan development to fit topography, etc.
2. Expose smallest practical area for shortest time possible
3. Erosion prevention practices (primary)
4. Sediment control at perimeter (secondary)
5. Inspect, maintenance, follow-up

# Construction Runoff Control

## 3. Erosion prevention practices (primary)

a. Special grading methods

b. Diversions – dikes / bales to steer water

c. Runoff control structures

d. Temporary / permanent vegetation

e. Mulching



# Construction Runoff Control

4. Sediment control at perimeter (secondary)
  - a. Silt fences / Straw bales
  - b. Interceptor dikes and ditches
  - c. Stone construction entrances
  - d. Vegetative filters
  - e. Sediment basins



# Training (for more information)

25<sup>th</sup> Annual Resource Management Conference

“Green Building Low Impact Development: What’s  
in It For You?”

**Wednesday, April 1, 2009**

Tulsa Homebuilder Association, 11545 E. 43<sup>rd</sup> Tulsa

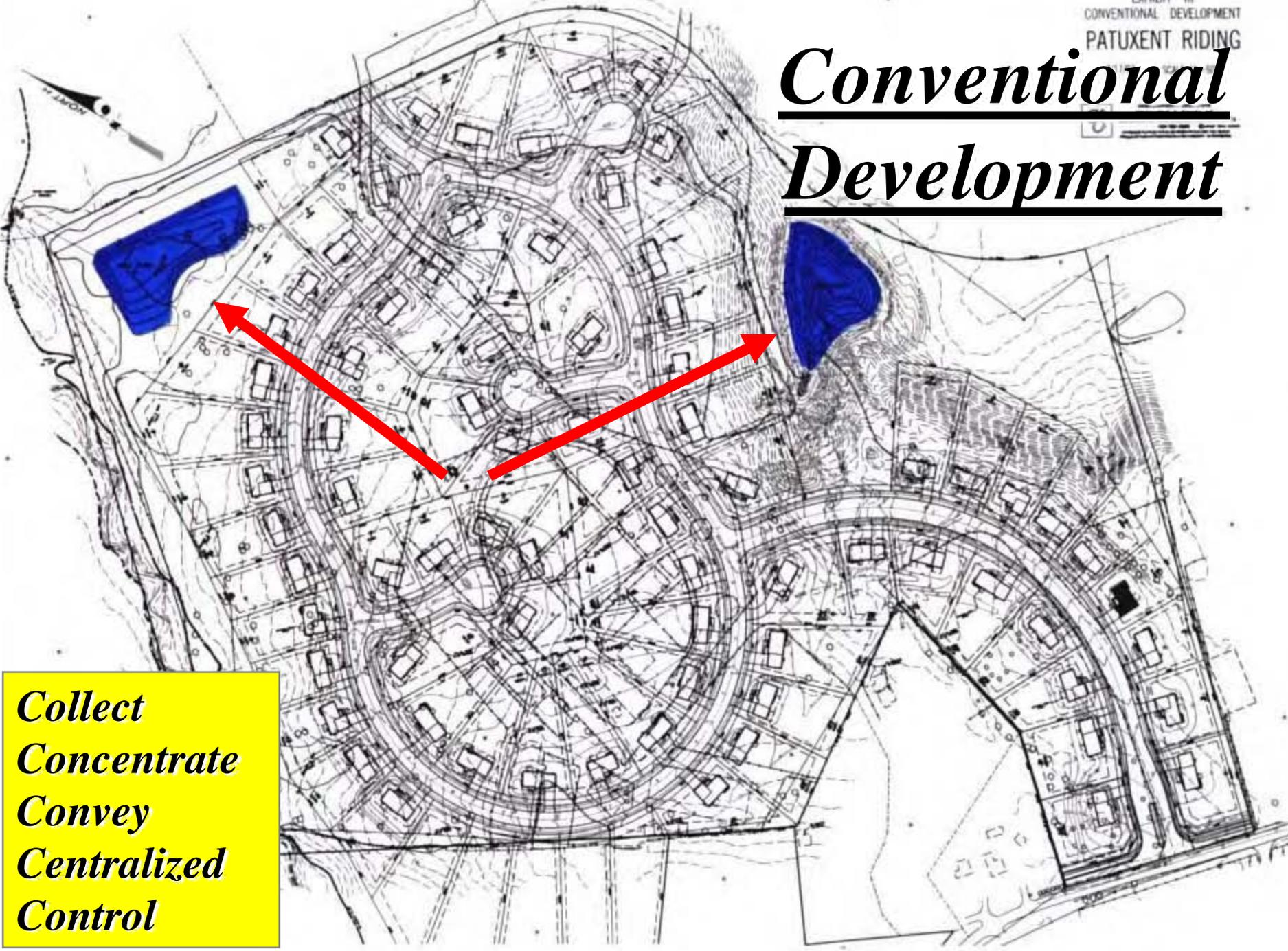
Questions???

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# Conventional Development



*Collect*  
*Concentrate*  
*Convey*  
*Centralized*  
*Control*

# Construction Cost Comparison

	<u>Patuxent Riding</u>	
	<u>Conventional</u>	<u>Low Impact</u>
<u>Grading /Roads</u>	\$ 569,698	\$ 426,575
<u>StormDrains</u>	\$ 225,721	\$ 132,558
<u>SWM Pond / Fees</u>	\$ 260,858	\$ 10,530
<u>Bioretention / Micro</u>	\$ -	\$ 175,000
<u>Total</u>	\$ 1,086,277	\$ 744,663
<u>Unit Cost</u>	\$ 14,679	\$ 9,193
<u>Lot Yeild</u>	74	81